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CASE REPORT

Neuraxial morphine induced pruritus in two cats and treatment with sub anaesthetic doses of propofol

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Abstract

History Two cats were presented for orthopaedic surgery.

Physical Examination With the exception of the orthopaedic injuries found, clinical examination showed no abnormality.

Management As part of anaesthetic management, one cat received intrathecal morphine, the other epidural morphine. Following recovery, intense grooming was observed. After ensuring adequate analgesia this behaviour was interpreted as pruritus. In the first cat, pruritus was initially managed with medetomidine constant rate infusion (CRI) at 1 and 1.5 μg kg^{-1} $hour^{-1}$. The lower dose produced sedation and no relief from pruritus, the higher dose ablated pruritus but induced sedation. Two propofol (lipid emulsion formulation) boli of 0.1 mg kg^{-1} ablated pruritus without causing sedation. The second cat was successfully treated with four boli of 0.1 mg kg^{-1} propofol over 20 minutes.

Follow-up Following treatment with propofol, pruritus did not recur in either cat and both were discharged from the hospital.

Conclusions This is the first clinical report of morphine-induced pruritus in cats and management with low-dose propofol. These cases suggest an antipruritic mechanism for lipid-formulation propofol.

Keywords cat, morphine, neuraxial anaesthesia, propofol, pruritus.

Introduction

Pruritus following epidural and intrathecal morphine administration in humans is a commonly reported side effect (Szarvas et al. 2003) and in dogs the incidence is reported to be 0.8% (Troncy et al. 2002). The mechanisms behind the pruritis are uncertain. A brainstem located itch centre, hypersensitivity to drugs, aberrant transmission of pain pathways and involvement of serotoninergic pathways have all been mentioned as possible factors (Szarvas et al. 2003). Evidence from clinical investigations in humans directly implicates opioid pathways (Borgeat et al. 1992; Charuluxananan et al. 2001).

The medical literature is conflicting on the best mode of treatment. The drug interventions include propofol, droperidol, naloxone, ondansetron, butorphanol and nalbuphine. There is conflicting evidence as to whether propofol has any efficacy (Borgeat et al. 1992; Beilin et al. 1998).

There have been previous reports that neuraxial morphine induces pruritus in cats (Koenigstein 1948; Bauquier 2012), and there are also clinical reports of its occurrence in dogs and horses (Haitjema & Gibson 2001; Troncy et al. 2002; Burford & Corley 2006; Kalchofner et al. 2007; Iff et al. 2012) although a successful treatment regimen has yet to be described. This case report describes the first documentation of neuraxial morphine-induced

pruritus and its management with subanaesthetic doses of propofol in cats.

Case details

Two cats presenting for orthopaedic surgery received similar perianaesthetic management as described below. Intravenous (IV) ketamine (Narketan, Vétoquinol, Switzerland) 4 mg kg^{-1} and midazolam (Dormicum, Roche, Switzerland) 0.1 mg kg^{-1}were given as premedication. Anaesthesia was induced with IV propofol (Propofol 1% MCT, Fresenius Kabi, Switzerland) to effect followed by orotracheal intubation with a cuffed tube, which was then connected to a small animal circle system. Anaesthesia was maintained in both cats with isoflurane (Isoflo, Abbott, Switzerland) delivered with a carrier gas of 50% oxygen and 50% medical air with spontaneous ventilation. As part of a balanced anaesthetic technique, neuraxial administration of local anaesthetic and morphine via the lumbosacral space was planned. All drugs used for intrathecal and epidural injections were taken from previously unopened vials and morphine (1% Morphin HCl, Sintetica, Switzerland) was preservative free. The skin was clipped and aseptically prepared by a five minute scrub using povidone-iodine followed by a wash with ethanol. Sterile gloves were used throughout the procedure. With the cat in lateral recumbency, a 22 gauge spinal needle was advanced through the skin and ligamentum flavum until a "pop" was felt. The needle hub was observed for free flow of cerebrospinal fluid and lack of resistance to injection of sterile saline containing an air-bubble was confirmed before injection of drugs. The injections into the neuraxial space were performed slowly, over approximately two minutes. Post-operative analgesia was achieved with buprenorphine (Temgesic, Reckitt Benckiser, Switzerland) 0.02 mg kg^{-1} IV every 6 hours starting 30 minutes before extubation, and oral meloxicam (Metacam Oral for Cats, Boehringer Ingelheim, Switzerland) 0.05 mg kg^{-1} every 24 hours starting as soon as an adequate swallowing reflex was observed. Cats received 10 mL kg^{-1} $hour^{-1}$ Ringers Lactate IV throughout the operative period, and a fentanyl (Sintenyl, Sintetica, Switzerland) 5 μg kg^{-1} $hour^{-1}$ constant rate infusion (CRI) was commenced 10 minutes before the first incision and stopped at the end of surgery, prior to extubation. Cephazolin (Kefzol, Teva Pharma, Switzerland) 22 mg kg^{-1} was administered as an IV bolus once every 120 minutes.

Case histories, diagnosis and management

Case 1

A five year old female neutered Domestic Short Haired cat was presented following traumatic hip luxation and onset of stifle instability. General physical examination, biochemistry and haematology were unremarkable and surgical reduction of the luxation was scheduled. A dose of 6 mg kg^{-1} of propofol was required for induction of anaesthesia. Ropivacaine (Naropin, Astra Zeneca, Switzerland) was mixed with morphine for neuraxial injection. The cat was initially placed in lateral recumbency with the leg requiring surgery underneath. Cerebrospinal fluid was observed in the needle hub indicating inadvertent intrathecal placement of the needle tip. Only half of the intended volume was used resulting in the final dose administered being 0.5 mg kg^{-1} ropivacaine and 0.05 mg kg^{-1} morphine. The cat was repositioned to the contra-lateral recumbency with the surgical limb uppermost for 5 minutes following injection in order to optimise the level of sensory blockade from the injected hypobaric solution. Surgery proceeded uneventfully and at the end, after endotracheal extubation, the cat was allowed to recover in a warmed box. One hour after endotracheal extubation (three and a half hours after morphine administration), the cat was found to be grooming intensely at the contralateral hind leg and perineum opposite the surgical site. The cat was agitated (modified Ramsay sedation score 1) and the behaviour was initially interpreted as pain. An IV medetomidine (Dorbene, Zoetis, Switzerland) CRI (1 μg kg^{-1} $hour^{-1}$) was initiated. Two hours after the start of medetomidine CRI, the cat was less agitated (sedation score 3–Ramsay scale; quiet and responsive to manipulation) but continued to groom the hind limb contralateral to the surgical site. The CRI was increased to 1.5 μg kg^{-1} $hour^{-1}$, which resulted in a cessation of grooming and an increase sedation score to 5 (sluggish response to stimulus). To assess if the increased medetomidine CRI resolved the pruritic signs, infusion was reduced again to 1 μg kg^{-1} $hour^{-1}$ and the grooming returned, accompanied by a reduction in sedation score to 3. Because grooming continued and was consistently on the unaffected limb the tentative diagnosis was changed from "pain" to pruritus, possibly opioid induced. Forteen hours after intrathecal injection of morphine, two IV boli of propofol